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Investigating Instructional Strategies in a Human Anatomy and Physiology Laboratory

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Abstract

Laboratory teaching, an essential component of Human Anatomy and Physiology (A&P) courses, is often based on a lecture-based presentation. The application of active learning strategies in teaching has been documented to increase student performances. However, studies on the effectiveness of instructional strategies in A&P laboratories and the evaluation of students’ preferences have been inadequate. The current study aimed to both effectiveness and student acceptance in the context of adoption of a team-based teaching method for the A&P laboratory. We offered team-based projects in two out of six laboratory sections. The group that engaged in team-based projects for half of the laboratory sessions, these active learning projects consisted of near-peer teaching, group discussions, and other activities. Other sections (control group) were taught only in the traditional method. Both methods were used to assess student performance. Qualitative analyses were performed on the anonymous feedback that was provided by the students that participated in this study. The data indicates that students in the experimental group (team-based projects) outperform those taught using traditional methods. The team-based method according to the survey was better appreciated among students, which improved teacher-student interaction and facilitated peer discussion. It also promotes critical thinking, kept student more engaged in the lab, and helped them develop skills outside academies. We believe that, by optimizing team-based teaching in A&P laboratories, we can create an active learning environment to enhance students’ performances, knowledge, and skills on the subject.

Methodology

Students enrolled in CHBS2204L (Anatomy and Physiology I Laboratory) were taught materials using a “hands on” method as well as traditional didactic methods. The team-based learning modules were incorporated into the current curriculum to investigate the effectiveness of the various instructional strategies that will be used as a regular part of the course, as well as to investigate students’ perceptions of the efficacy of these strategies. This research may benefit other instructors in higher education by quantifying the effectiveness of different instructional strategies.

Results

Table 1: Questionnaire Results

<table>
<thead>
<tr>
<th>Question</th>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>1. How much did your teaching strategy improve your understanding of the laboratory material?</td>
<td>22</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td>2. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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<tr>
<td>3. What aspects of your teaching strategy improved your understanding of the laboratory material?</td>
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<tr>
<td>4. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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<tr>
<td>5. What aspects of your teaching strategy improved your understanding of the laboratory material?</td>
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<tr>
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<td>7. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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<td>8. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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<td>9. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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<tr>
<td>10. How much did your teaching strategy improve your understanding of the laboratory material?</td>
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</table>

(a) Survey Questionnaire and Student Responses. The survey questionnaire encompasses multiple aspects of student cognitive outputs to evaluate the traditional as well as the team-based teaching methodology. “No preference” option enabled the students to express their minimal views for a given question. The students provided the feedback anonymously. Numbers under A, B, and C represents the number of students that expressed a particular response. A total of 76 students were surveyed and 10 students did not provide any feedback.

(b) Team Based Teaching Methodology Preference (Pie-Chart). Student preferences for different teaching methodology was expressed in percent derived from the cumulative responses.

Discussion

The Human Anatomy and Physiology (A&P) labs are aimed at improving student understanding of the anatomy and physiology by facilitating hands-on experience and complementing the lecture classes. However, the laboratory sessions are not very often well designed to fulfill these basic objectives. Lecture-based teaching is still in practice in the lab and the focus on the use of team based active learning strategies has been undermined. We studied the effectiveness of team-based instructional strategies in A&P laboratories. Preliminary class assessment revealed that students prefer visual learning of the anatomical concepts. We optimized the use of available visual aids along with educational games, role playing, concept mapping, group discussion, near-peer teaching, and simulations in experimental labs to evaluate the effectiveness of the team based method over the traditional method. Both quantitative and qualitative assessment was performed to derive the conclusions. The quantitative assessment based on test scores indicated that the groups taught by team based method scored better in 4 out of 7 sessions. This performance could be attributed to team-based teaching strategy. The student survey suggests that as many as 52% of the students preferred the team based method of teaching. The team based method of teaching also found to be more engaging and interactive which are essential for optimum learning. Also, students agreed that team based teaching method promotes critical thinking skills among students. Based on these information we believe that team based teaching methodology is more appropriate in the A&P labs because of the fact that it has extra advantages over traditional method of teaching.

Conclusion

• Most students expressed that visuals are the best means for them to learn in the Human Anatomy and Physiology Lab.
• Students expected that the laboratory sessions will improve their learning level in Anatomy and Physiology and supplement the lecture classes.
• Students in the lab that were taught by team based teaching strategy outperformed the students in 57% of the (out of 7) laboratory sessions.
• The team based teaching method was appreciated by 52% of the students surveyed where as 31% students preferred the traditional method of teaching and 17% students did not have a preference.

Acknowledgements

Sincere thanks to Dr. DeLoris Hesse for generously supporting the teaching project under close supervision. Thanks to the Institutional Review Board (IRB) at UGA for reviewing and approving the proposal. Many thanks to the students who voluntarily participated in the study and facilitated the success of the project.

I also thank my advisor Dr. Kojo Mensa-Wilmot for the support towards my teaching, related research and conference presentation.

Project Summary

Title of the Study: Investigating instructional strategies in a Human Anatomy and Physiology laboratory.
Principal Investigator: Dr. DeLoris Hesse

The above-mentioned proposal was reviewed and approved by “The University of Georgia Institutional Review Board (IRB)” through the exempt (administrative) review procedure authorized by 45 CFR 46.101(b)(2).